We claim:

1. A method for transmitting data in a data communications network, comprising the steps of:

(i) establishing a communications link between a transmitter and a receiver, the communications link having a congestion window set to an initial length;

(ii) transmitting data packets from the transmitter to the receiver;

(iii) detecting a missing packet at the receiver;

(iv) sending a negative acknowledgment from the receiver to the transmitter for the missing data packet;

(v) decreasing the length of the congestion window in response to the negative acknowledgment; and

(vi) re-transmitting the missing packet.

2. A method according to claim 1, wherein up to four duplicate negative acknowledgments are sent from the receiver.

3. A method according to claim 1, wherein the congestion window is halved at step (v).

4. A method according to claim 1, further including a step of setting a round-trip timer at the transmitter upon transmitting the data packet.

5. A method according to claim 4, wherein the congestion window is increased upon expiry of the return trip timer.

6. A method according to claim 5, wherein the congestion window is doubled.

7. A method according to claim 1, wherein a keep-alive request is periodically sent from the transmitter to the receiver, whereupon a re-transmission time-out timer is set.

8. A method according to claim 7, wherein the transmitter determines if an acknowledgment

to the keep-alive request is not received before expiry of the re-transmission time-out timer, whereupon the transmitter backs off for a predetermined period.

9. A method according to claim 1, wherein the congestion window is decreased in response to three duplicate negative acknowledgments.

10. A method according to claim 1, wherein the data communications network in an internet.

11. A method for error recovery in a data communications network where data is transmitted as a sequence of data packets sent from a transmitter to a receiver, comprising the steps of:

(i) detecting a missing packet at the receiver;

(ii) sending a negative acknowledgment from the receiver to the transmitter for the missing packet;

(iii) setting a missing-packet timer at the receiver upon sending the negative acknowledgment; and

(iv) where the missing packet is not received at the receiver in response to the negative acknowledgment before expiry of the missing-packet timer, sending a further negative acknowledgment.

12. An error recovery method according to claim 11, wherein the missing packet is detected according to a gap in sequence numbers of the stream of data packets.

13. An error recovery method according to claim 11, wherein up to four negative acknowledgments are sent from the receiver to the transmitter before expiry of the missing-packet timer.

14. An error recovery method according to claim 11, wherein the missing-packet timer is cleared upon receipt of the missing packet at the receiver.

15. A method for congestion control in a data communications network where data is transmitted as a sequence of data packets from a transmitter to a receiver, comprising the steps of:

(i) setting a congestion window to an initial size, the congestion window relating to a transmission rate over the network;

(ii) transmitting a data packet from the transmitter to the receiver;

(iii) setting a round-trip timer at the transmitter upon sending the packet;

(iv) increasing the congestion window if no negative acknowledgment for the data packet is received before expiry of the round-trip timer; and

(v) decreasing the length of the congestion window if a negative acknowledgment for the data packet is received at the transmitter.

16. A congestion control method according to claim 15, further including a step of empirically determining the round-trip time.

17. A congestion control method according to claim 16, wherein a round-trip time update request is sent to the receiver.

18. A congestion control method according to claim 15, wherein the congestion window is doubled, and an interval between transmission of subsequent data packets is decreased, upon expiry of the round-trip timer.

19. A congestion control method according to claim 15, wherein the congestion window is multiplicatively increased.

20. A congestion control method according to claim 15, further including steps of sending a keep-alive request from the transmitter to the receiver, and setting a re-transmission time-out timer to detect a re-transmission time-out.

21. A congestion control method according to claim 20, wherein the congestion window is set

to one for a back-off period if no acknowledgment is received in response to the keep-alive request, before expiry of the re-transmission time-out timer.

22. A data communications system employing transmission control protocol for providing error recovery and congestion control on a data communications network, comprising:

a transmitter for sending a sequence of data packets, the transmitter having a round- trip timer that is set upon sending each data packet;

a receiver for receiving the sequence of data packets, the receiver detecting a missing packet in the sequence of data packets, and returning a negative acknowledgment for the missing data packet to the transmitter to cause re-transmission of the missing data packet; and

means for adjusting a congestion window in response to receipt of the negative acknowledgment, and expiry of the round-trip timer.

23. A system according to claim 21, further including a missing-packet timer at the receiver upon expiry of which a final negative acknowledgment is sent to the transmitter.

24. A system according to claim 21, further including a re-transmission time-out timer at the transmitter, the means for adjusting responding to expiry of the re-transmission time-out timer.